



N 沟道增强型场效应晶体管 N-CHANNEL MOSFET FHP280N1F2A/FHA280N1F2A

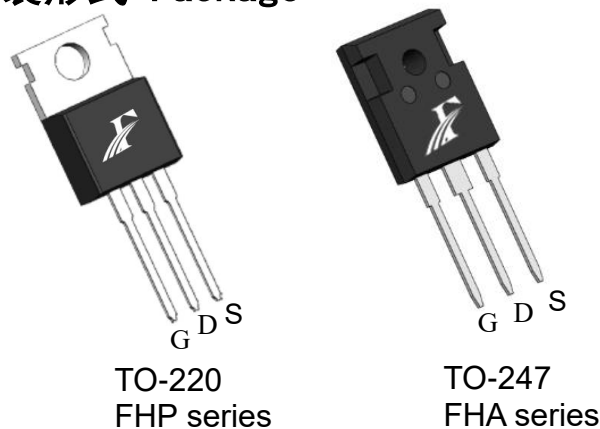
主要参数 MAIN CHARACTERISTICS

ID	280 A
VDSS	100 V
Rdson-typ (@Vgs=10V)	2.1 mΩ
Qg-typ	224 nC

用途 APPLICATIONS

高频开关电源	High efficiency switch mode power supplies
逆变器	Power Management in Inverter System
同步整流	Synchrnous Rectification

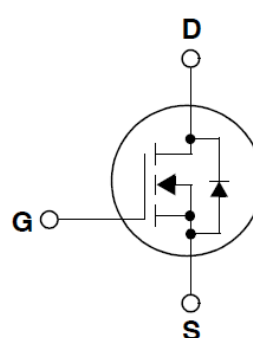
封装形式 Package



产品特性 FEATURES

低栅极电荷	Low gate charge
低 Crss (典型值 328 pF)	Low Crss (typical 328 pF)
开关速度快	Fast switching
100%经过雪崩测试	100% avalanche tested
100%经过热阻测试	100% DVDS tested
100%经过 RG 测试	100% Rg tested
高抗 dv/dt 能力	Improved dv/dt capability
SGT 工艺	SGT technology
符合 RoHS 标准	ROHS compliant

等效电路 Equivalent Circuit



绝对最大额定值 ABSOLUTE RATINGS (Tc=25°C)

项目 Parameter	符号 Symbol	数值 Value		单位 Unit
		FHP280N1F2A	FHA280N1F2A	
最高漏极-源极直流电压 Drain-Source Voltage	V _{DS}	100		V
连续漏极电流* Drain Current -continuous *	I _D (T _c =25°C)	280		A
	I _D (T _c =100°C)	243		A
最大脉冲漏极电流 (注 1) Drain Current – pulse (note 1)	I _{DM}	1120		A
最高栅源电压 Gate-Source Voltage	V _{GS}	±20		V
单脉冲雪崩能量 (注 2) Single Pulsed Avalanche Energy (note 2)	E _{AS}	288		mJ
雪崩电流 (注 1) Avalanche Current (note 1)	I _{AS}	24		A
二极管反向恢复最大电压变化速率 (注 3) Peak Diode Recovery dv/dt (note 3)	dv/dt	5.0		V/ns
耗散功率 Power Dissipation	P _D (TC=25°C)	243	329	W
	-Derate above 25°C	1.94	2.63	W/°C
最高结温及存储温度 Operating and Storage Temperature Range	T _J , T _{STG}	150, -55 to 150		°C
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T _L	260		°C

*漏极电流由最高结温限制

*Drain current limited by maximum junction temperature

电特性 ELECTRICAL CHARACTERISTICS

项目 Parameter	符号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
关态特性 Off –Characteristics						
漏-源击穿电压 Drain-Source Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	100	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA, referenced to 25°C	-	0.1	-	V/°C
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V, T _C =25°C	-	-	1	μA
		V _{DS} =80V, T _C =125°C	-	-	100	μA
栅极体漏电流 Gate-body leakage current	I _{GSS} (F/R)	V _{DS} =0V, V _{GS} =±30V	-	-	±100	nA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	2.0	-	4.0	V
静态导通电阻 Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V , I _D =50A	-	2.1	2.5	mΩ
动态特性 Dynamic Characteristics						
栅电阻 Gate Resistance	R _g	f=1.0MHz, V _{DS} OPEN	-	1.3	-	Ω
输入电容 Input capacitance	C _{iss}	V _{DS} =50V, V _{GS} =0V, f=1.0MHz	-	11260	-	pF
输出电容 Output capacitance	C _{oss}		-	1715	-	
反向传输电容 Reverse transfer capacitance	C _{rss}		-	328	-	
开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	t _{d(on)}	V _{DS} =50V, I _D =10A, R _G =3Ω V _{GS} =10V (note 4, 5)	-	34	-	ns
上升时间 Turn-On rise time	t _r		-	26	-	ns
延迟时间 Turn-Off delay time	t _{d(off)}		-	78	-	ns
下降时间 Turn-Off Fall time	t _f		-	30	-	ns
栅极电荷总量 Total Gate Charge	Q _g	V _{DS} =50V , I _D =100A , V _{GS} =10V (note 4, 5)	-	224	-	nC
栅-源电荷 Gate-Source charge	Q _{gs}		-	80	-	nC
栅-漏电荷 Gate-Drain charge	Q _{gd}		-	38	-	nC
漏-源二极管特性及最大额定值 Drain-Source Diode Characteristics and Maximum Ratings						
正向最大连续电流 Maximum Continuous Drain-Source Diode Forward Current		I _S	-	-	280	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}	-	-	1120	A
正向压降 Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _{SD} =50A	-	-	1.2	V
反向恢复时间 Reverse recovery time	t _{rr}	V _{GS} =0V, I _S =100A ,dI _F /dt=50A/μs (note 4)	-	100	-	ns
反向恢复电荷 Reverse recovery charge	Q _{rr}		-	280	-	nC

热特性 THERMAL CHARACTERISTIC

项目 Parameter	符号 Symbol	FHP280N1F2A	FHA280N1F2A	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	Rth(j-c)	0.51	0.38	°C/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	Rth(j-A)	62.5	40	°C/W

注释:

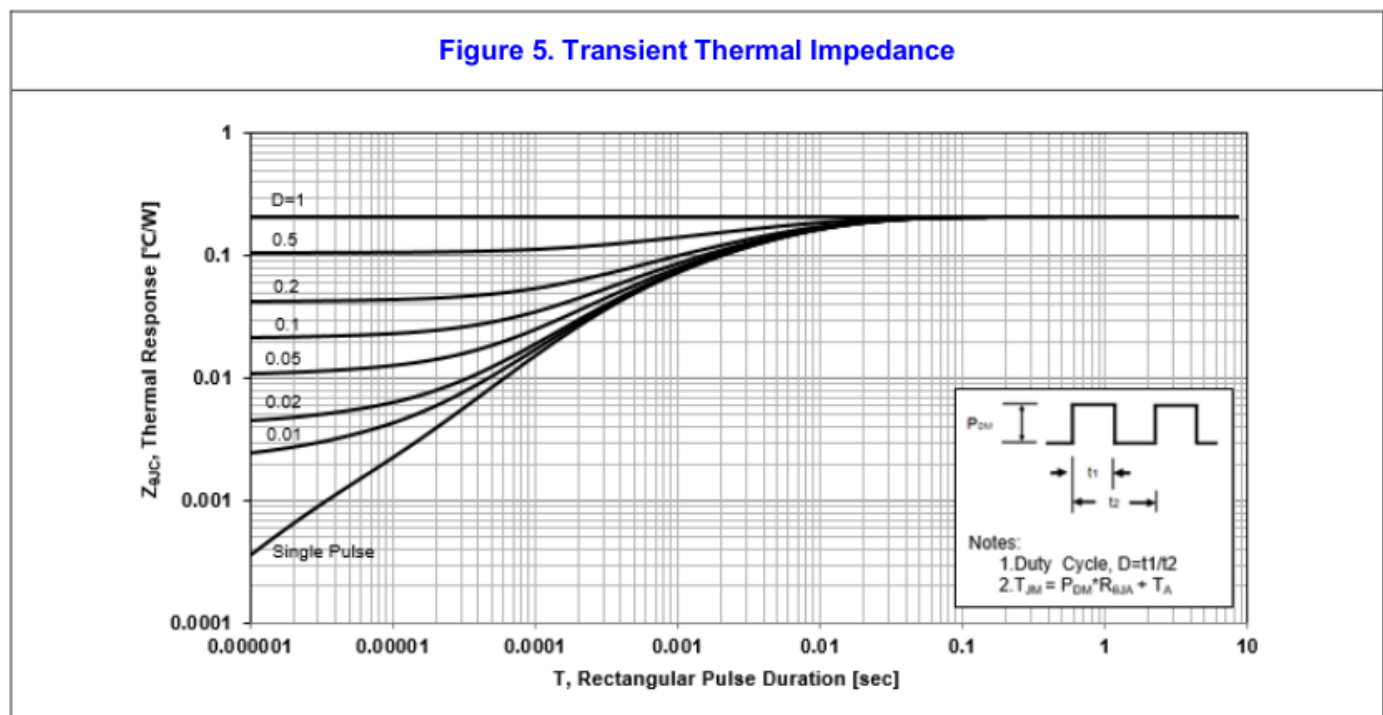
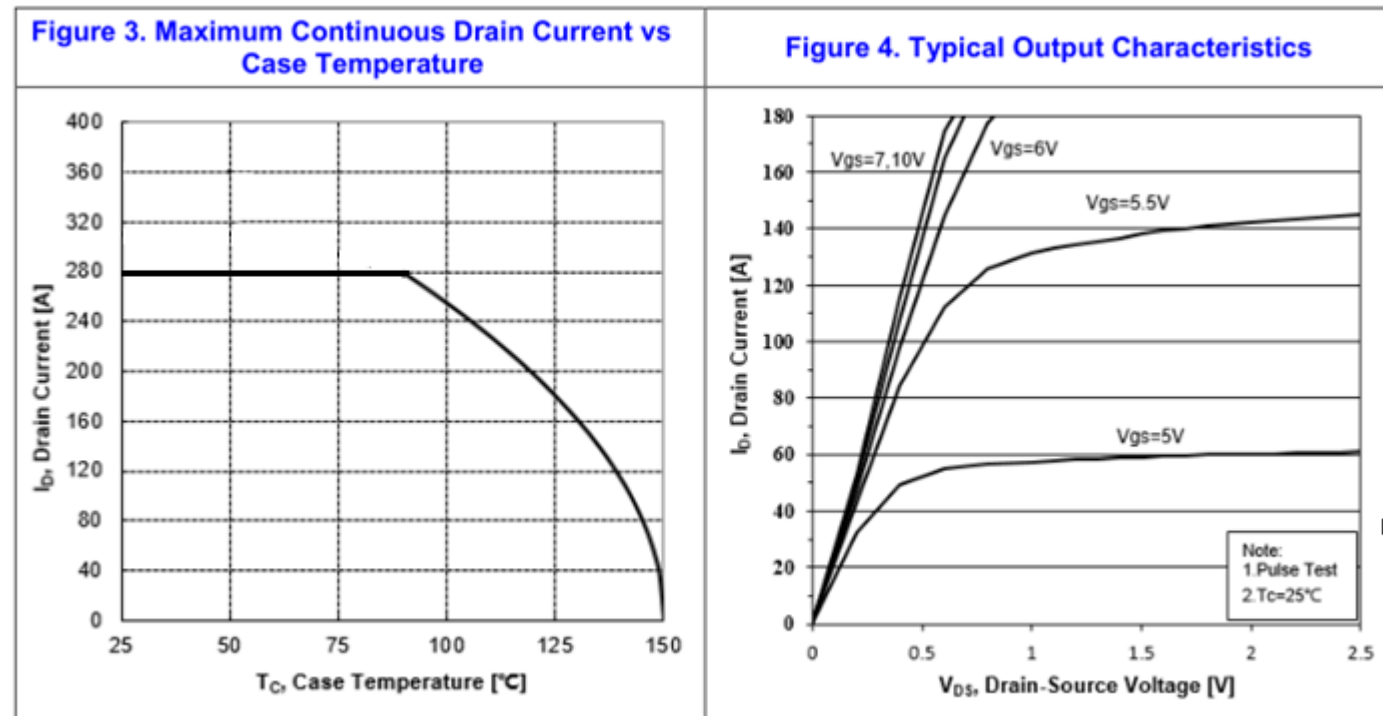
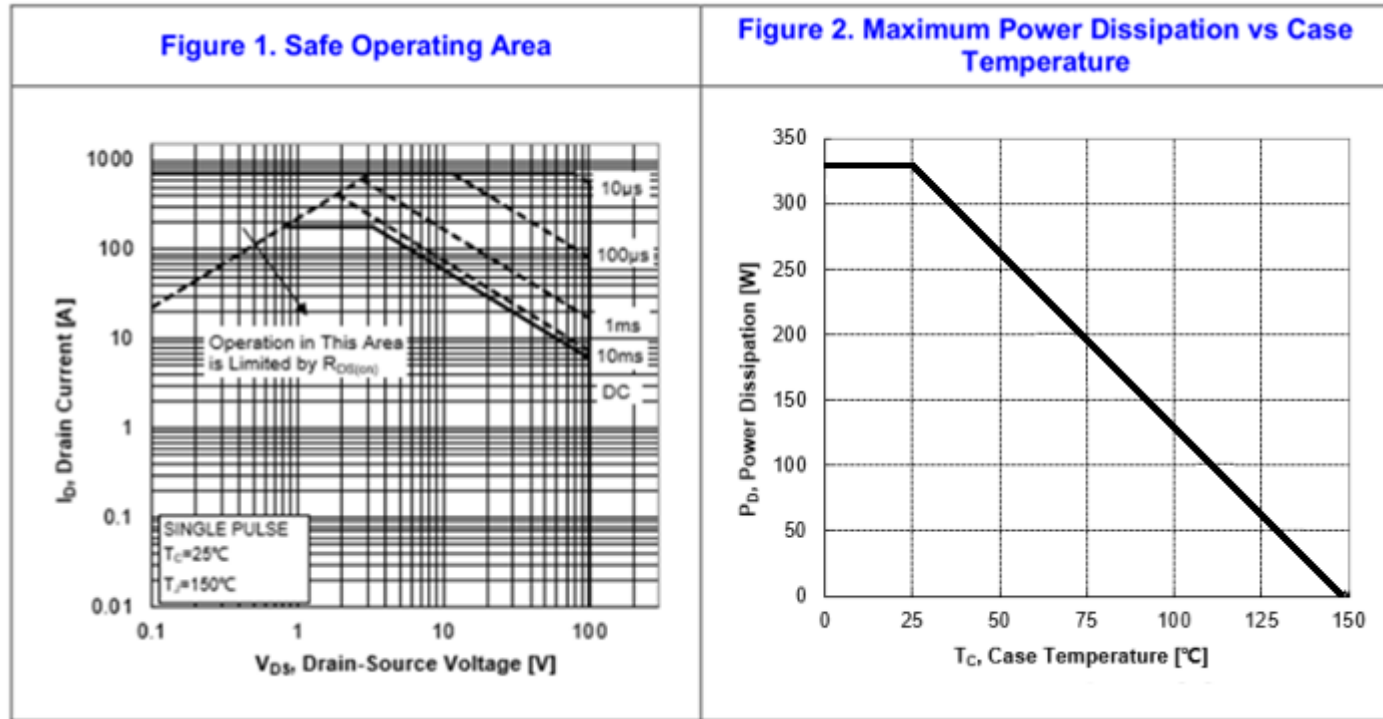
- 1: 脉冲宽度由最高结温限制
- 2: L=1mH, IAS=24A, VDD=50V, RG=25 Ω, 起始结温 TJ=25°C
- 3: ISD ≤310A, di/dt ≤200A/μs, VDD≤BV_{DSS}, 起始结温 TJ=25°C
- 4: 脉冲测试: 脉冲宽度 ≤300μs, 占空比≤2%
- 5: 基本与工作温度无关

Notes:

- 1: Pulse width limited by maximum junction temperature
- 2: L=1mH, IAS=24A, VDD=50V, RG=25 Ω, Start TJ=25°C;
- 3: ISD ≤310A, di/dt ≤200A/μs, VDD≤BV_{DSS}, Starting TJ=25°C
- 4: Pulse Test: Pulse Width ≤300μs, Duty Cycle≤2%
- 5: Essentially independent of operating temperature

特性曲线

(ELECTRICAL CHARACTERISTICS (curves))



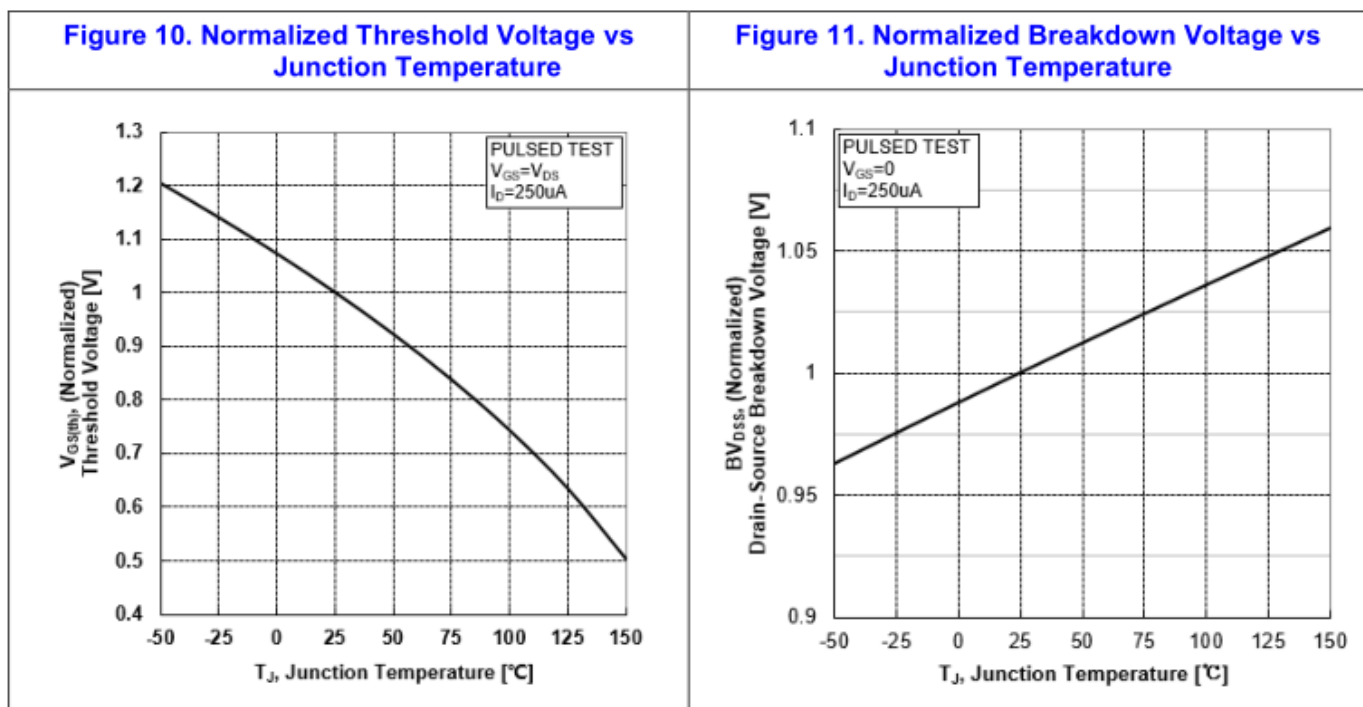
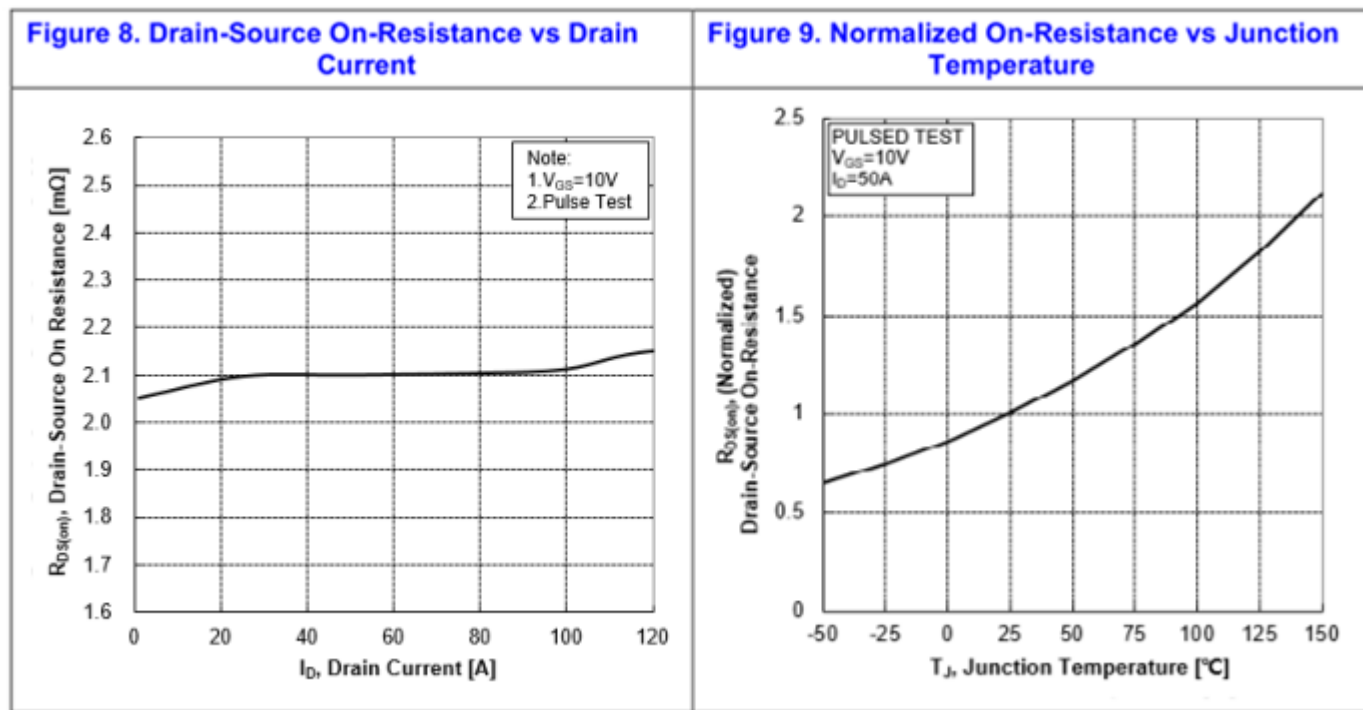
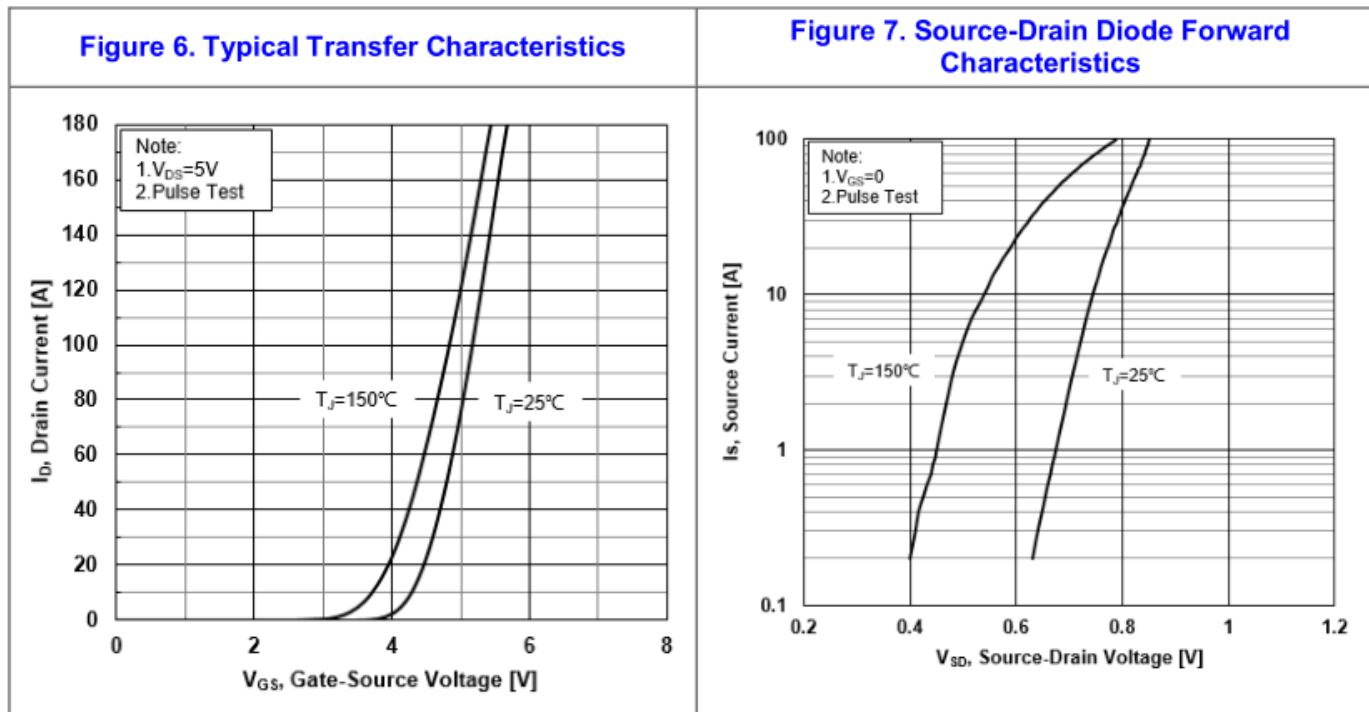


Figure 12. Capacitance Characteristics

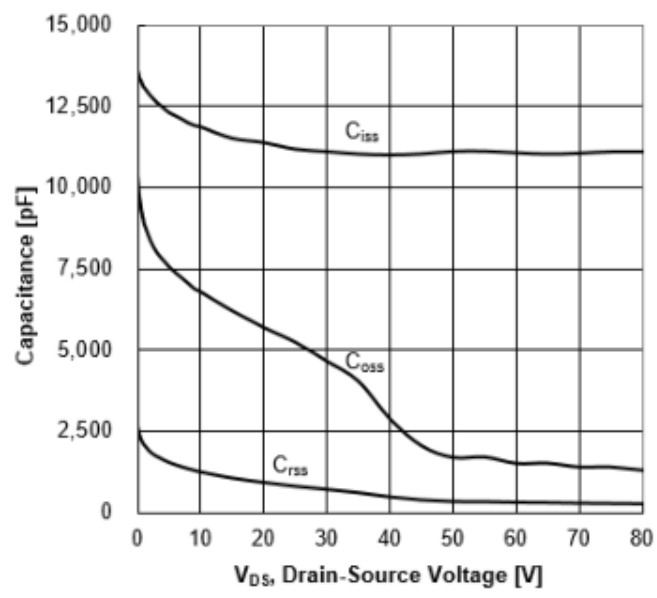
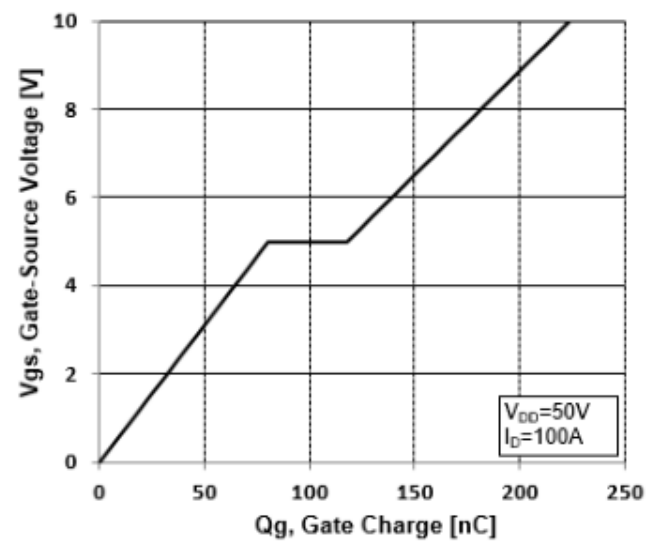
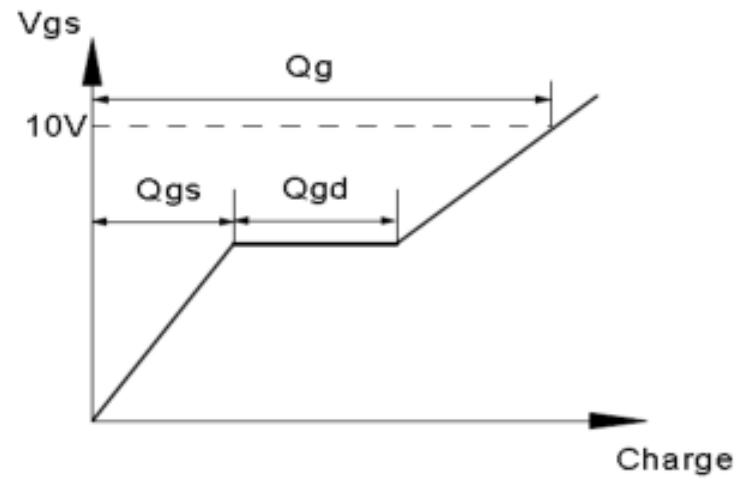
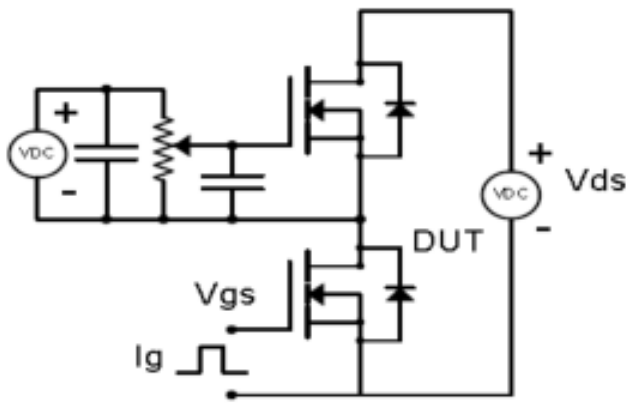


Figure 13. Typical Gate Charge vs Gate-Source Voltage

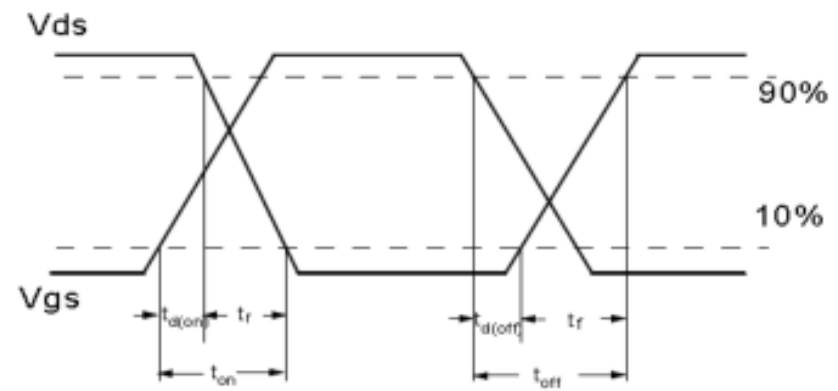
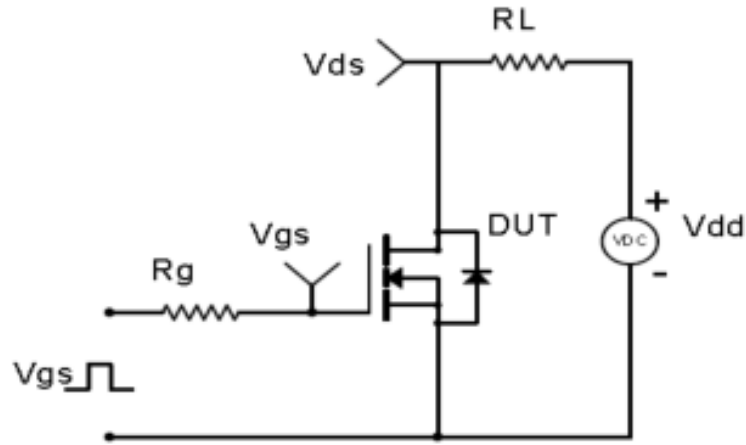


Test Circuit & Waveform

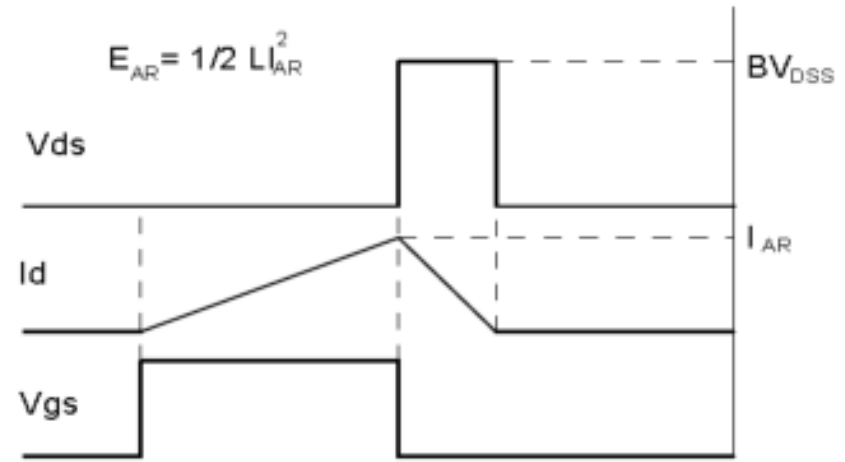
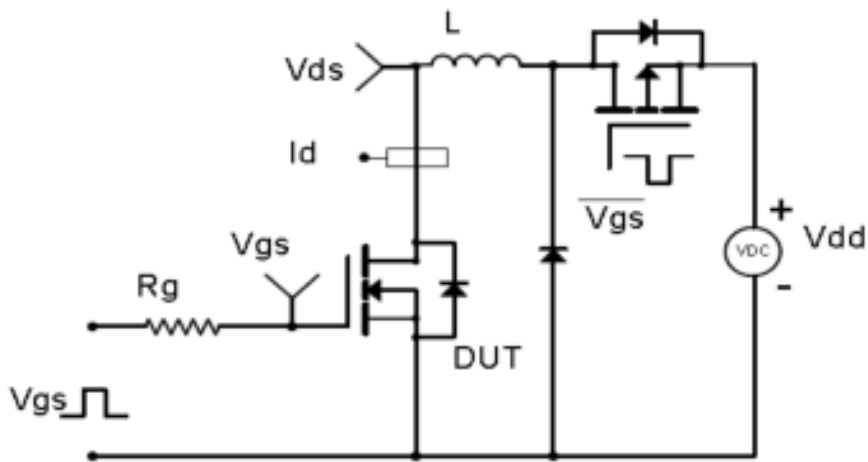
Gate Charge Test Circuit & Waveform



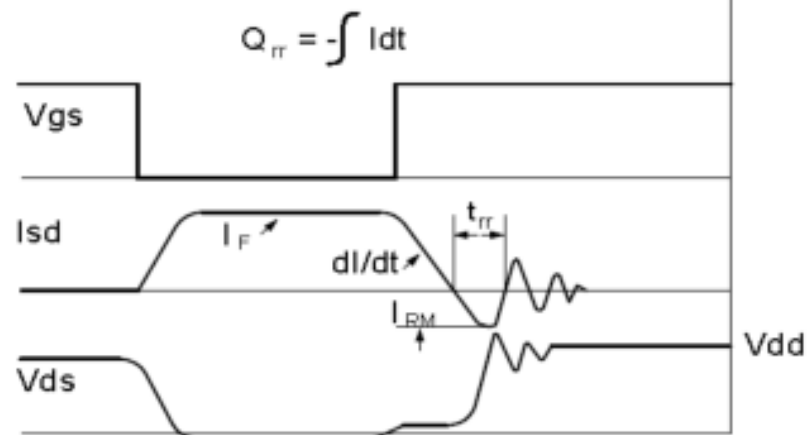
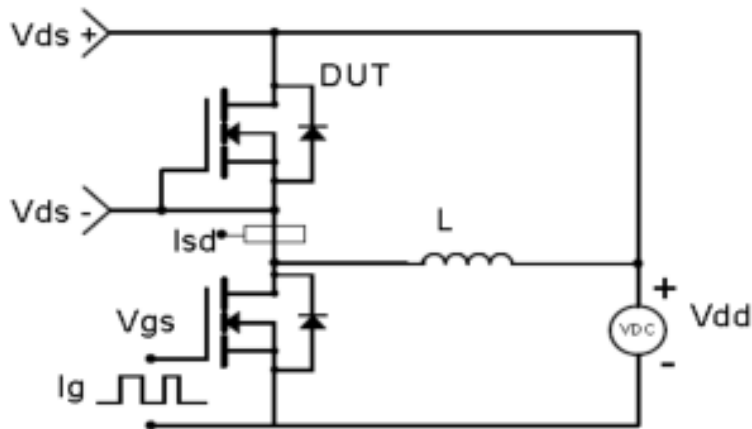
Resistive Switching Test Circuit & Waveforms



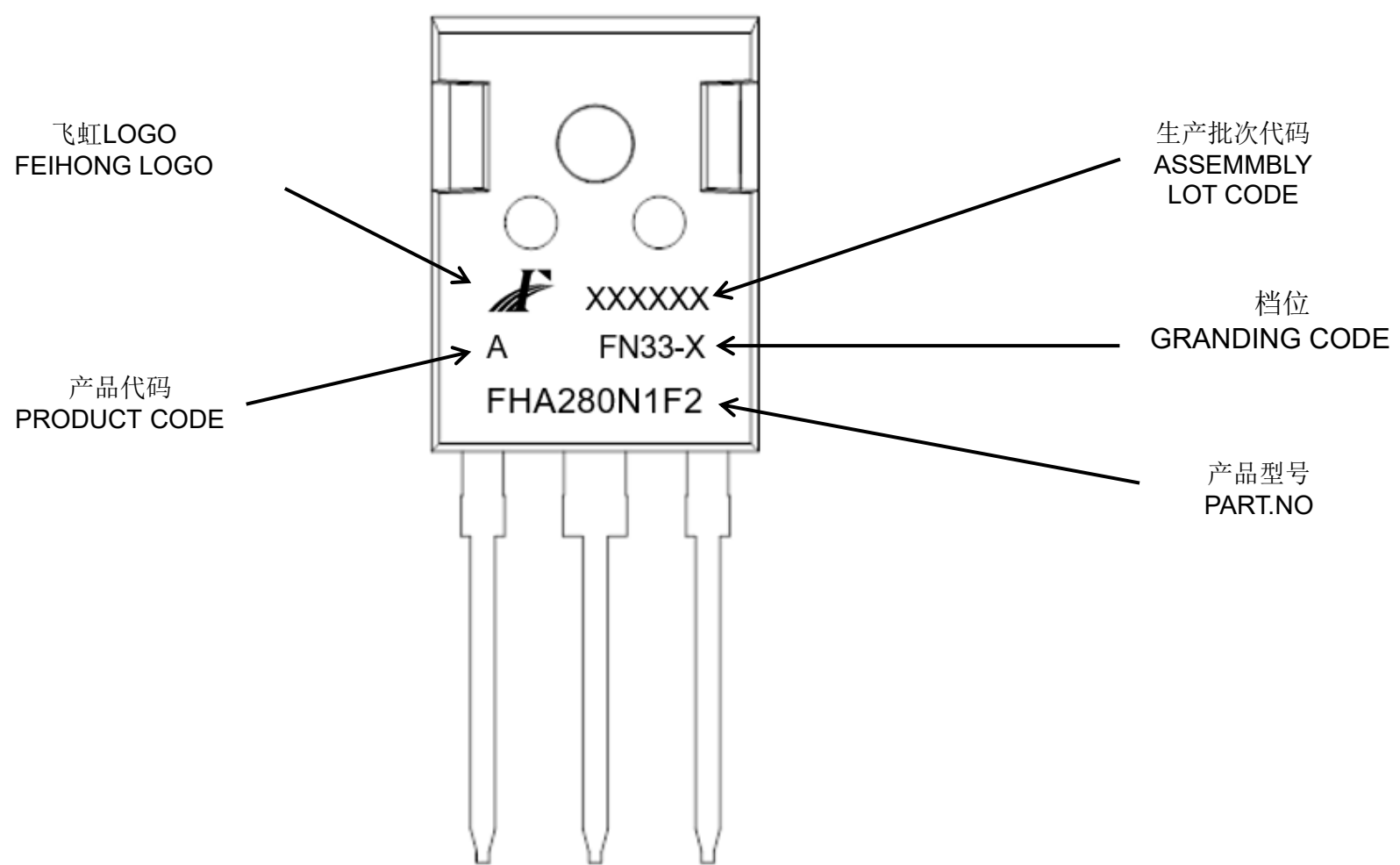
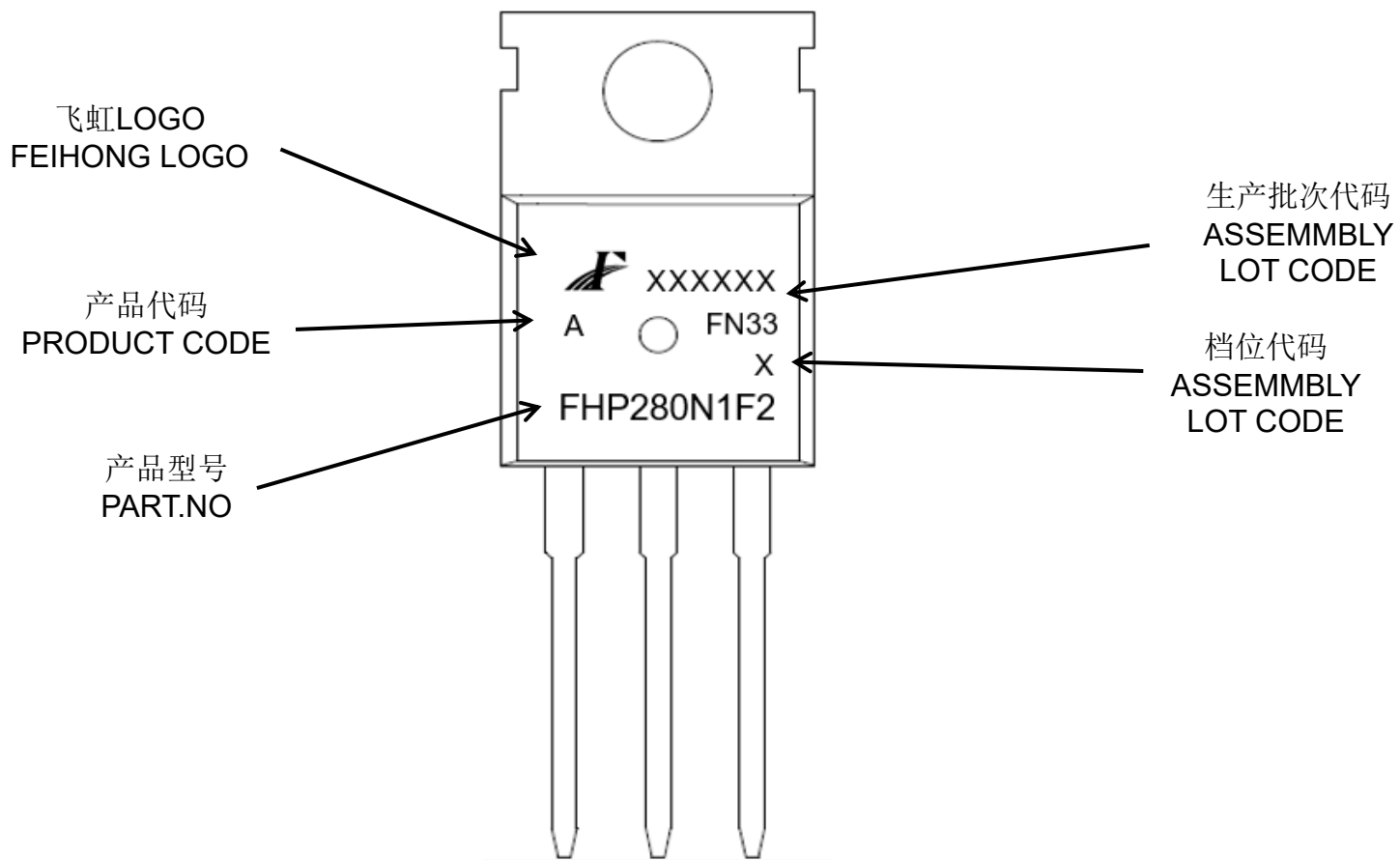
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



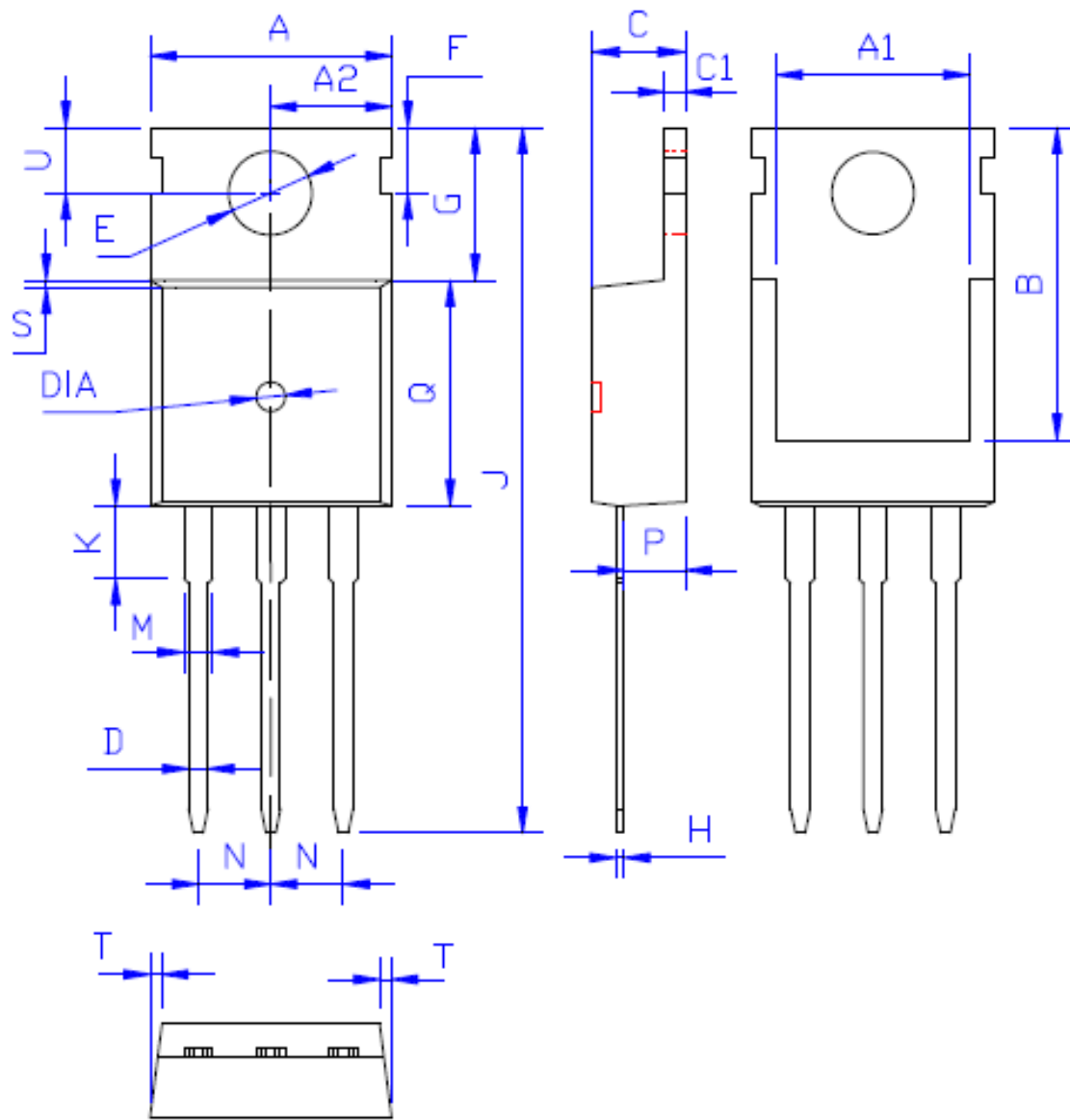
印记 Marking:



外形尺寸:

Package Dimension:

TO-220



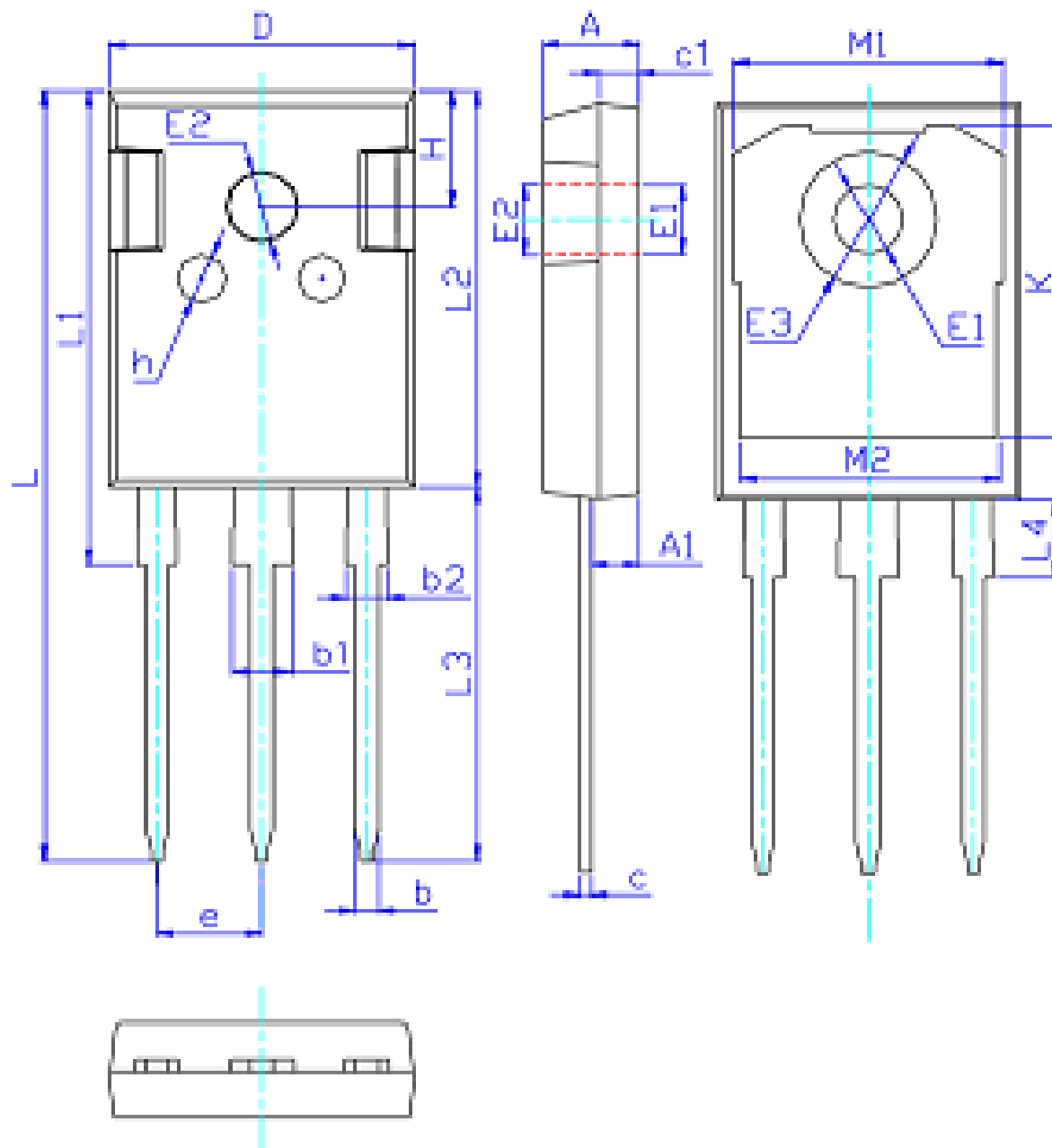
DIM	MILLIMETERS
A	10.00±0.30
A1	8.00±0.30
A2	5.00±0.30
B	13.20±0.40
C	4.50±0.20
C1	1.30±0.20
D	0.80±0.20
E	3.60±0.20
F	3.00±0.30
G	6.60±0.40
H	0.50±0.20
J	28.88±0.50
K	3.00±0.30
M	1.30±0.30
N	Typical 2.54
P	2.40±0.40
Q	9.20±0.40
S	0.25±0.15
T	0.25±0.15
U	2.80±0.30
DIA	宽 1.50±0.10 深 0.50 MAX

(Unit: mm)

外形尺寸:

Package Dimension:

TO-247



标注	尺寸(mm)
A	5.00±0.05
A1	2.41±0.05
b	1.2±0.05
b1	3.05±0.05
b2	2.05±0.05
c	0.60±0.05
c1	2.00±0.05
D	15.80±0.10
E1	3.60±0.05
E2	3.70±0.05
E3	7.19±0.05
L	40.92±0.10
L1	24.95±0.10
L2	21.00±0.10
L3	19.92±0.10
L4	4.10±0.05
e	5.44±0.05
H	6.15±0.05
h	2.50±0.05
K	16.45±0.10
M1	14.00±0.10
M2	13.30±0.10